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The Importance of Functional Literacy: Reading and Math Skills and Labour Market Outcomes of High School Drop-outs

by Ross Finnie and Ronald Meng

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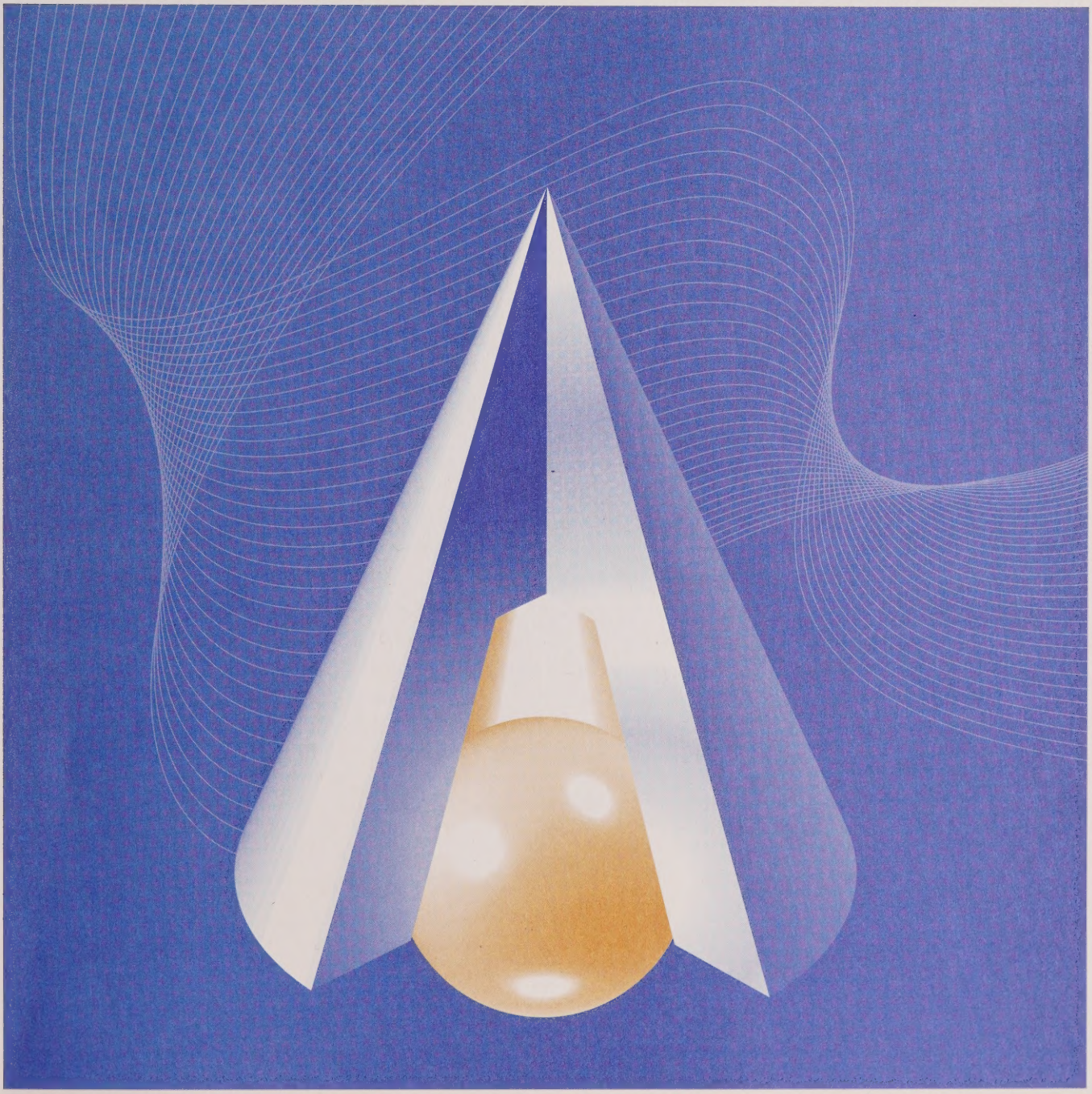

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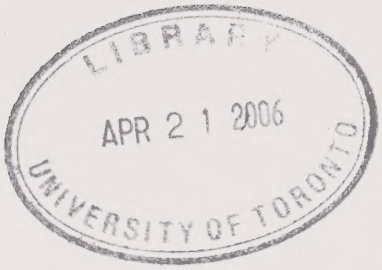

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The Importance of Functional Literacy: Reading and Math Skills and Labour Market Outcomes of High School Drop-outs

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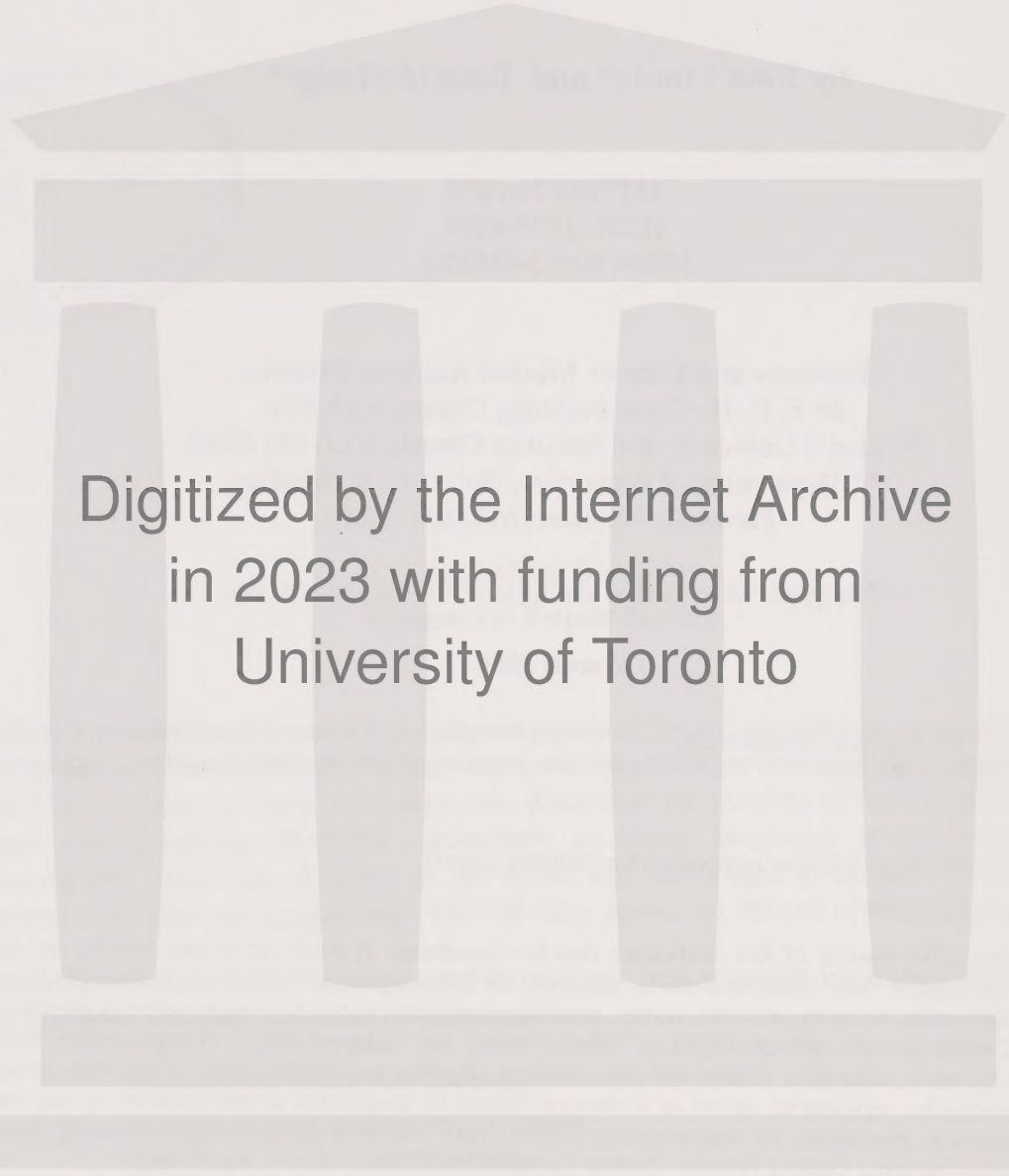

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Abstract

This study assesses the effects of literacy and numeracy skills on the labour market outcomes of Canadian high school drop-outs. We find that these skills have significant effects on the probability of being employed and on hours and weeks of work for both men and women, and also have strong (direct) influences on men's, but not women's, incomes. These findings imply that high school curricula that develop literacy and numeracy skills could provide significant returns even for those who do not complete their programs and wind up at the lower end of the labour market. Our findings similarly suggest that training programs catering to drop-outs could substantially improve these individuals' labour market outcomes by developing these basic skills. The results also have implications for dual labour market theory, since it is often assumed that the secondary market is characterized by minimal returns to human capital—contrary to what is found here.

Keywords: return to literacy and numeracy, low-skilled workers

I. Introduction

The technology-driven "knowledge-based" economy has received much attention in both the academic and popular press going back well over a decade. One specific area of interest is the associated new skill requirements and—obversely—how those lacking the appropriate levels and types of human capital have been left behind in the modern economy.

This paper focuses on one specific issue relating to workers, skills and labour markets by investigating how literacy and numeracy skills affect outcomes for those at the bottom end of the Canadian labour market. More specifically, we estimate the effects of literacy and numeracy skills—along with more traditional educational measures—on the employment status and incomes of high school drop-outs.

While the economic analysis of the effects of educational attainment has been the subject of a vast number of studies (see Card, 1999 for a review of the literature), the role of literacy and numeracy in determining the economic well-being of individuals has comprised an important addition to human capital theory. Previously, most research on the relation between education and labour market outcomes ignored these skills, or simply assumed that they were captured by the conventional education measures.

But more recently, studies by Rivera-Batiz, 1990a, 1990b, 1992, Charette and Meng, 1994a, 1998, Murnane et. al. 1995, Finnie and Meng, 2001a, 2002, 2005, Pryor and Schaffer, 1999, and Green and Riddell, 2001 have demonstrated that literacy and/or numeracy skills influence labour market status and incomes separately from education, and that educational attainment is at best an imperfect proxy for these abilities.[1] In this paper, we exploit the unique properties of Statistics Canada's Literacy Skills Used in Daily Activities (LSUDA) survey—including the availability of test scores rather than self-reported competency levels for the key literacy and numeracy measures[2]—to focus on the relationships between these skills and various labour market outcomes of high school drop-outs.

Identifying the effect of literacy and numeracy skill test scores on labour market outcomes of early school leavers allows us to address some important questions relating to the economic opportunities of these individuals. If those who drop out of school are confined to secondary labour markets where human capital in the form of language and numeracy skills has little or no affect on their economic status (Doeringer and Piore, 1971), then we should find that these skills play little role in explaining employment status or incomes. If, alternatively, literacy and numeracy skills are revealed to have significant effects on these outcomes, such a finding would have implications not only for dual labour market theory, but also for public policy issues relating to high school curricula and adult education and re-training programs.

1. In virtually all the studies cited here, the inclusion of literacy/numeracy measures reduces the magnitude of the effects and statistical significance of the education variables in conventional human capital earnings models. That said, education and literacy and numeracy skills are clearly related to each other in a causal fashion, and this full set of relationships has not been investigated to much degree (see Finnie and Meng (2001b)).

2. See Finnie and Meng (2005) on the comparison of test scores versus self-reported skill levels and their effects in employment and income models.

The paper is laid out as follows. First we describe the LSUDA data used in the analysis and present some descriptive statistics for drop-outs and others. Second, we investigate some of the determinants of dropping out of school, focussing on socio-economic background effects such as parents' education levels and immigration status. We next analyse the drop-out population in terms of employment status, considering a number of binary outcomes, including whether or not the person has been employed in the last 12 months, is employed at the time of the survey, or currently works full-time, as well as the number of weeks worked in the last 12 months. We then estimate a set of income (earnings) functions for both drop-outs and non drop-outs (for comparison). In all cases, our focus is on measured cognitive skills—literacy and numeracy test score levels. The paper concludes with a summary of the main findings and some of their implications.

II. Data and descriptive statistics

This analysis uses the master file of the Canadian Survey of Literacy Skills Used in Daily Activities (LSUDA) database. The survey contains information on individuals' reading and arithmetic skills, as well as incomes, labour force status, family background and educational attainment (Statistics Canada, 1991).

The full LSUDA file represents a weighted survey of 9,455 Canadian residents aged 16 to 69 years old in 1989. Our analysis is restricted to native-born Canadian men and women aged 21 to 54 years old who were not in school at the time of the interview.[3] This sub-sample consists of 2,318 men and 2,806 women, of whom 851 men and 872 women dropped out of high school before completion.

The LSUDA measures of literacy and numeracy are based on item response theory or latent trait scoring. The resulting measures are continuous variables ranging from 0 to 500.[4] Unfortunately, the two variables are so closely related that it is often difficult to separate the independent effects of each on incomes or other labour market activities.[5] The sample correlation between literacy and numeracy for both the men and women in our survey is 0.77.

To deal with this problem, some researchers have used only literacy in their analyses (Rivera-Batiz, 1990a, 1990b), others have used numeracy (Rivera-Batiz, 1992), while still others have used both (Charette and Meng, 1998). More recently, Pryor and Schaffer, 1999 and Green and

3. Immigrants are excluded from the analysis because the relationships between literacy, numeracy, education, and labour market outcomes are different for this group than native-born Canadians (Finnie and Meng (2002)). Older individuals (55-64 years) are not included in order to avoid issues related to individuals moving into retirement.

4. A literacy score of less than 150 implies individuals are "having difficulty with printed material" (i.e., they are essentially illiterate). A numeracy score of less than 200 implies "having very limited numeracy abilities which enables them to, at most, locate and recognize numbers in isolation or in a short text" (i.e., they are effectively innumerate) (Statistics Canada, 1991, pp. 17-18).

5. Besides the fact that literate people also tend to be numerate, many of the numeracy questions were "embedded" in a subset of the reading tasks in the LSUDA questionnaire. In other words, in order to do many of the arithmetic calculations it was necessary to first understand the written instructions in the question.

Riddell, 2001 have reported that taking the simple average of the two variables yields the best results and is easier to interpret in a context where it is difficult to identify their separate effects. We follow these later examples by using the average of the literacy and numeracy scores, and adopt Pryor and Schaffer's term for this composite variable—"functional literacy".

Table 1 provides brief descriptions and sample means for the variables used in the analysis. They can be grouped into three categories. The first represent labour market activity and outcomes, and include EMP, WORK, FTIME, and WWORK, and LNINC. Not surprisingly, both the male and female drop-out samples have reduced labour market attachment and lower incomes than their more educated counterparts. Their functional literacy test scores are also significantly below those of graduates.[6]

The second group of variables represents measures of individuals' socio-economic backgrounds. These include parents' education levels (MED, FED) and immigration status (MIMM, FIMM), the individual's province of birth and first language, and whether or not they claim to be an Aboriginal Canadian (NATIVE), disabled (DIS), or to have experienced learning difficulties as a child (LDIFF).[7] The data indicate that individuals who graduate from high school have far more educated parents than those who drop out, the differences varying from 2.4 to 2.9 years. Children of immigrants also stay in school longer than children of native-born Canadians. Drop-outs are disproportionately born in Atlantic Canada, spoke French as a child, are Aboriginal Canadians, experienced learning difficulties in childhood, and have a disability.

The third group of variables captures individuals' current characteristics and circumstances (i.e., at the time of the survey). These include age, years of education, region of residence, city size, preferred language as an adult, marital status, and the presence of children. On average, the drop-out samples (male and female) are four and a half years older than those who stayed in school, have five years less education (largely by construction), and disproportionately live in Atlantic Canada, do not speak English as a first language, live in smaller populated areas, and are married with children.[8]

Table 2 presents some (weighted) averages of the functional literacy scores of men and women by labour market activity. The differences between the scores are striking, not only between the graduates and non-graduates, but also between those in and out of the labour market. For men who work mostly full-time, the difference in test scores between the two groups is 29.4. With the standard deviation in the test score for the graduates being 29.7, their score is a full standard deviation higher than the average score for those who did not finish high school. Yet as poor as the scores are for drop-outs who work, they are still significantly higher than the scores for those not in the labour force. As Pryor and Schaffer (1999) conclude when looking at somewhat

6. Difference-in-means tests for the functional literacy scores yield t-statistics of 17.8 for men and 23.2 for women, both of which are significant at the one percent level.

7. Having a disability is referred to as a background variable although it cannot determine whether or not the disability existed in childhood or occurred later.

8. As adults, there are very few people, about 0.6% of the population, that claim a first (preferred) language other than English or French. For simplicity, we included them with the French language group.

similar U.S. results: "[the functional literacy averages] hardly seem consistent with active participation in the heralded 'information age'" (p. 23).

III. Dropping out

Table 3 presents the estimation results for the models of dropping out of school. A probit model is employed, but we also show the calculated marginal effects of each explanatory variable.[9] Not surprisingly age—here representing cohort effects since all individuals dropped out of school when relatively young—is positively associated with the probability of dropping out of school. For every additional year, the increased probability of having left school for men is almost 1% (0.95%), and for women it is 0.77%. Interestingly, the province of birth effects, at least for men, are not as significant as the raw data suggest, indicating that province is correlated with other explanatory variables included in the models. For women, place of birth is much more significant, with individuals born in Quebec, the Prairie provinces, and British Columbia having significantly lower probabilities of dropping out than those born in Atlantic Canada (the omitted category).

Having experienced learning difficulties as a child increases the probability of leaving school early by about 19% for both men and women. Aboriginal Canadians also have a noticeably higher drop-out rate (even after controlling for parental education and the other influences captured by the variables included in the model), whereas the childhood language variable has little impact on schooling outcomes.

In terms of parental influences, mother's and father's education both exert a strong influence on individuals' educational attainment. A two-and-a-half-year increase in mother's and father's education, roughly the difference in mean parental education levels for graduates and non-graduates (see Table 1), reduces men's and woman's chances of dropping out of school by about 15%. While the evidence is not overwhelming, mothers appear to have a greater impact on their daughters' educational attainment than their sons', while fathers have a greater impact on their sons' than their daughters' educational attainment. Such a parent-child gender pattern of influences is also seen in the significant impact of mothers' immigration status on their daughters' chances on dropping out of school.[10]

9. We control for heteroskedasticity using White's technique.

10. We also included several interaction variables to capture additional cohort and other cross effects. These included Age x Parent's Education, MED x FED, and Age squared. None of the estimated coefficients were statistically significant.

IV. Labour market outcomes

IV.1 Labour force status and weeks worked

Table 4 presents our probit estimates for the determinants of working full-time (FTIME), of being employed during the last 12 months (EMP), and of being currently employed (WORKING) for those individuals who dropped out of school.[11]

For both men and women, functional literacy has a positive impact on working full-time, being employed over the last 12 months, and being currently employed. Indeed, functional literacy is significantly more important in explaining labour market activity than is formal education (EDUC). The last row of Table 4 displays the percentage effect of a one standard deviation increase in functional literacy on these employment status variables. For men, a one standard deviation increase in functional literacy score increases the probability of the outcomes between 1.4% and 4.3%. For women, the effects are all substantially greater, from 8.6% to 10.4%.

The parameter estimates for the other explanatory variables indicate further differences between men and women. The relation between working and age is non-linear for men, peaking at age 38.3 for working full-time, and 44.8 and 37.8 years, respectively, for the other two outcomes. In the case of women, however, there is no clear age/employment relationship. Having a disability has no direct influence on male market activity, while it has an adverse effect on women. The presence of children has a negative impact for women, but not men. The regional and city residence variables are in many cases significant for women, but only rarely so for men. Finally, Aboriginal Canadians do not show patterns different from other native-born Canadians – once, of course, the other variables included in the models are taken into account (they tend to have lower levels of education and functional literacy in particular).

Table 5 presents the results for the models of total weeks worked (WWORK) in the year leading up to the survey. Recall that the raw differences between school drop-outs and those who completed high school are particularly great for this measure (Table 2). The explanatory variables are the same as those listed in Table 4, and we again adjust for sample selection.[12] Both LIT and EDUC have positive effects on weeks worked. Evaluated at the sample means, the elasticity of WWORK with respect to LIT and EDUC is 0.31 and 0.19, respectively, for men, and 0.81 and

11. To control for the jointness of dropping out of school and labour force participation, we adopt a two-stage procedure which includes first estimating a bivariate probit that jointly determines the probability of DROP = 1 with each of the binary variables listed above. The determinates of dropping out are those variables listed in Table 3, while the determinants of each of the other outcomes are indicated in Table 4. We then include the resulting sample selection term in the models for drop-outs. This approach is similar to that developed by Abowd and Farber, 1982. The estimates in Table 4 indicate that for men, the estimates for the adjustment term (RHO) are highly significant, while for women the variable is significant in just one of the three equations (Greene, 1990, 692).

12. The coefficient on λ (the inverse Mill's ratio adjustment term) is positive and significant for men, but negative for women.

0.31 for women; again, functional literacy has a greater impact on female labour supply than it does for men.[13]

The other independent variables generally behave as expected. The presence of children reduces the number of weeks worked for women; residents in Atlantic Canada, on average, work the least number of weeks; and age affects men's hours, but not women's.

IV.2 Incomes

Table 6 presents our estimates for the determinants of the log of annual income.[14] For comparison purposes, we include estimates for individuals who have at least a high school diploma along with those who dropped out of school. We also include two different sets of variables for selecting into work. The first selects on EMP, working in the last twelve months, and (not) dropping out of school (λ_1). The exogenous variables for the selection criteria are the explanatory variables listed in Table 4 as well as MED, FED, MIMM and FIMM.[15] The second set of exogenous variables for those who work and have (not) dropped out of school are the explanatory variables listed in Table 3 (λ_2).

For men, LIT exerts a strong effect on incomes – and *especially* for the drop-out sample. The point estimates reported in columns (1) and (2) are twice as large as those in (3) and (4) and their levels of significance (t-statistics) are also greater. Interestingly, years of education is barely significant for the male graduates and the point estimates are one-third the size of the EDUC coefficients for drop-outs. This latter result is, however, likely a product of two factors: a somewhat declining marginal return to education (which would generate the lower point estimates using our linear measure of years of education) and the strong correlation between functional literacy and education for this group (reducing the statistical significance of both measures).[16]

For women, however, the results are quite the opposite: the effect of LIT is significant for those with at least a high school diploma, but not for drop-outs. The return to years of education for both groups is significant and the point estimates are higher than the male estimates.

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13. The elasticities, especially for women, are quite high. However, Rivera-Batiz (1992) reports similar results in his study on the effects of quantitative literacy (numeracy) on the labour supply of men and women.

14. Unfortunately the LSUDA data base does not report annual earnings or wage rates. However, earnings constitute the greatest part of incomes, especially for prime age individuals such as these, and using earnings and incomes generally produces similar results. In any event, the equations perform well and are almost certainly very indicative of what would be found with an earnings or wage measure.

15. The four additional variables (MED, FED, MIMM, FIMM) are included for identification purposes.

16. Adding a squared EDUC term generally drove both the linear and quadratic terms to non-significance, so we remained with the simpler linear measure. Larger sample sizes might allow these effects to be better delineated.

The rest of the variables included in the models generally behave as expected. Of particular interest is that the age-income profiles are flatter for the less educated, and the region and size of area in which the individual lives are less important in their explaining income patterns.

It is worth pointing out that in three of the four income regressions for those with at least a high school diploma, the NATIVE variable is positive and significant, albeit only at the 10% level. Our estimates thus suggest that while Aboriginal Canadians have significantly higher drop-out rates than the rest of the population, their labour force and income patterns are not much different than those of others once the observables controlled for in the models are taken into account. Like George and Kuhn (1994) and Finnie and Meng (2001b), we conclude that the income differences between natives and whites are primarily due to "endowment" rather than "discrimination" effects.

V. Conclusion

Overall, there is little doubt in the economics literature that literacy and numeracy skills contribute to individuals' economic and social well-being. It is, however, unclear as to whether this holds for all individuals, including those at the bottom end of the labour market, or just those with higher levels of education who are more plugged into "the new knowledge economy". Our findings suggest that for high school drop-outs, who tend to have very low functional literacy scores, literacy and numeracy skills do in fact (with the sole exception of females' incomes) have significant effects on individuals' labour market outcomes at the margin – and this independently of the effects of formal education. Indeed, in some cases (e.g., men's incomes), the effects of functional literacy appear to be substantially greater than years of education.

Tuijnman (2001) recently compared Canadian literacy rates to those in 20 other countries, including the United States, the United Kingdom, and many European countries. Whereas Canadians at or near the top of the literacy distribution scale (the top 25%) had overall scores well above similar samples for many industrialized countries, those with the lowest scores (the bottom 25% scored poorly compared to the lowest scores in other countries). Furthermore, Canadians scored fifteenth out of 21 countries in "literacy inequality" (i.e., the variance in the distribution). Interpreting our results in this context, it is interesting to observe that while Canadian drop-outs' functional literacy scores are low when compared to either more educated Canadians or those abroad, having higher levels of these skills has significant effects on these individuals' labour market outcomes.

Pryor and Schaffer (1999) and many others have shown that there has been a downward occupational mobility for many jobs in the North American economy, with university graduates often doing jobs that high school graduates could do, the latter starting to do those jobs that drop-outs used to do, and greater competition for those jobs that require minimal skills. Our results suggest, however, that those at the bottom end of the economic ladder are not completely trapped in a secondary labour market with few options available to them. Instead, skills matter, and helping such individuals increase their literacy and numeracy abilities could be an important means of improving their labour market opportunities.

Table 1: Variable descriptions and means

		Men		Women	
Variable name	**Description**	**Drop-out**	**High school graduate and above**	**Drop-out**	**High school graduate and above**
LIT	Functional literacy	238.8	271.3	236.4	275.3
FTIME	Work mostly full-time	0.88	0.91	0.44	0.66
EMP	Employed at least once in last 12 months	0.91	0.97	0.63	0.87
WORKING	Presently employed	0.82	0.92	0.50	0.77
WWORK	No. of weeks worked in last 12 months	41.5	47.1	26.4	38.8
LNINC*	Log of income	10.08	10.27	9.20	9.73
MED	Mother's years of education	7.9	10.5	8.1	10.5
FED	Father's years of education	7.6	10.5	7.6	10.3
MIMM	Mother immigrant	0.09	0.14	0.11	0.15
FIMM	Father immigrant	0.10	0.15	0.11	0.16
ATLB	Born in Atlantic Canada	0.16	0.10	0.15	0.12
QUEB	Born in Quebec	0.32	0.31	0.40	0.30
ONTB	Born in Ontario	0.30	0.35	0.25	0.30
PRAB	Born in Prairie Province	0.17	0.18	0.18	0.19
BCB	Born in British Columbia	0.05	0.06	0.03	0.09
NATIVE	Aboriginal Canadian	0.05	0.02	0.06	0.03
DIS	Have a disability	0.12	0.06	0.12	0.07
ENGCH	Spoke English as a child	0.58	0.64	0.54	0.66
FRECH	Spoke French as a child	0.37	0.30	0.43	0.29

Table 1: Variable descriptions and means (concluded)

		Men		Women	
Variable Name	**Description**	**Drop-out**	**High school graduate and above**	**Drop-out**	**High school graduate and above**
OTHCH	Spoke other language as a child	0.04	0.06	0.03	0.06
LDIFF	Experienced learning difficulties as a child	0.17	0.10	0.16	0.09
AGE*	Age in years	38.1	33.6	38.3	33.5
AGE2*	Age squared	1546	1196	1557	1190
EDUC*	Years of education	9.3	14.4	9.3	14.4
ATL*	Live in Atlantic Canada	0.12	0.08	0.11	0.10
QUE*	Live in Quebec	0.29	0.29	0.31	0.27
ONT*	Live in Ontario	0.35	0.36	0.36	0.32
PRA*	Live in Prairie Province	0.15	0.18	0.16	0.19
BC*	Live in British Columbia	0.09	0.09	0.06	0.12
ENG*	English first language**	0.68	0.73	0.67	0.73
FRE*	French or other first language***	0.32	0.27	0.33	0.27
BCITY*	Pop > 100,000	0.40	0.63	0.49	0.62
SCITY*	99,999 < pop > 30,000****	0.11	0.11	0.09	0.11
RURAL*	Pop < 30,000	0.49	0.26	0.42	0.27
MARR*	Married (spouse present)	0.73	0.66	0.76	0.69
CHILD*	Have at least one child	0.58	0.50	0.65	0.55
N	Sample sizes	851	1467	872	1934

* Averages for the income equations
** Speaks English as an adult
*** Speaks French as an adult
**** 30,000 ≤ pop ≥ 99,999
Source: Master file of the Canadian Survey of Literacy Skills Used in Daily Activities (LSUDA).

Table 2: Functional literacy scores and labour force status*

	Men			Women		
	Drop-out	**High school and above**	**All**	**Drop-out**	**High school and above**	**All**
FTIME	243.2	272.6	261.8	245.3	275.8	266.3
EMP	242.3	271.8	261.0	244.6	276.5	266.6
WORKING	244.7	271.8	261.9	247.2	276.6	267.5
WWORK**	244.6	272.2	262.1	246.9	277.1	267.7
Not in the labour force	203.5	253.9	219.4	222.4	267.3	242.3

* Weighted means

** Average test score for the average number of weeks worked in a year

Source: Master file of the Canadian Survey of Literacy Skills Used in Daily Activities (LSUDA).

Table 3: The determinants of dropping out of school

Independent variables	Men		Women	
	(1) Coefficients	(2) Marginal effects (%)	(3) Coefficients	(4) Marginal effects (%)
AGE	0.0271 (8.33)	0.95*	0.0239 (8.07)	0.77*
QUEB	-0.2240 (2.20)	-7.86*	-0.2244 (2.41)	-7.27*
ONTB	-0.0723 (0.83)	-2.54	-0.0737 (0.90)	-2.38
PRAB	-0.0313 (0.34)	-1.10	-0.1509 (1.74)	-4.89**
BCB	-0.0346 (0.29)	-1.22	-0.3591 (3.26)	-11.63*
LDIFF	0.5308 (5.60)	18.63*	0.5905 (5.95)	19.12*
DIS	0.0746 (0.66)	2.62	0.0961 (0.82)	3.11
FED	-0.0913 (9.05)	-3.20*	-0.0876 (9.63)	-2.84*
MED	-0.0802 (8.16)	-2.81*	-0.1053 (10.55)	-3.41*
MIMM	-0.1251 (1.12)	-4.39	-0.3693 (3.17)	-11.96*
FIMM	-0.1224 (1.09)	-4.30	-0.0149 (0.14)	-0.48
NATIVE	0.4091 (2.41)	14.36*	0.4058 (3.54)	13.14*
ENGCH	-0.1354 (1.47)	-4.75	-0.1654 (1.94)	-5.36**
OTHCH	0.1250 (0.74)	-4.39	-0.0229 (0.14)	-0.74
Constant	0.3275 (1.85)		0.6036 (3.46)	
N (samples sizes)	2,318		2,806	

* Significant at the 5% level.
** Significant at the 10% level.
Note: Asymptotic t-statistics in brackets.
Source: Master file of the Canadian Survey of Literacy Skills Used in Daily Activities (LSUDA).

Table 4: Functional literacy, drop-outs and labour market status

Independent variables	Men			Women		
	FTIME	EMP	WORKING	FTIME	EMP	WORKING
LIT	0.0046 (2.89)	0.0055 (3.21)	0.0042 (3.23)	0.0038 (3.02)	0.0052 (4.00)	0.0055 (4.06)
EDUC	0.0072 (0.17)	-0.0273 (0.59)	0.0319 (0.90)	0.0826 (2.33)	0.0382 (1.10)	0.0163 (0.45)
AGE	0.1245 (2.02)	0.1590 (2.12)	0.2465 (4.98)	-0.0003 (0.01)	-0.0069 (0.15)	0.0110 (0.24)
AGE2	-0.0017 (2.14)	-0.0022 (2.33)	-0.0031 (4.75)	-0.0001 (0.17)	0.0004 (0.15)	-0.0001 (0.01)
DIS	0.0496 (0.27)	-0.0046 (0.02)	0.1530 (0.81)	-0.5464 (3.51)	-0.7126 (1.10)	-0.4719 (2.87)
ENG	-0.2462 (0.91)	-0.2748 (0.84)	-0.4243 (1.73)	0.0478 (0.21)	0.1169 (0.57)	0.0675 (0.31)
MARR	0.2637 (1.78)	0.6510 (3.16)	0.3521 (2.49)	0.1597 (1.36)	0.3573 (2.94)	0.3504 (2.82)
CHILD	-0.0048 (0.03)	-0.3162 (1.65)	-0.0722 (0.53)	-0.4672 (4.22)	-0.2306 (1.94)	-0.2143 (1.83)
ATL	-0.1301 (0.59)	-0.1032 (0.40)	-0.3539 (1.88)	0.0769 (0.45)	-0.3122 (1.74)	-0.6864 (3.86)
QUE	-0.3158 (1.08)	-0.2612 (0.78)	-0.4626 (1.71)	-0.2846 (1.22)	-0.4951 (2.27)	-0.7122 (3.07)
PRA	-0.2413 (1.12)	-0.0268 (0.10)	0.1381 (0.70)	-0.0244 (0.15)	-0.0879 (0.47)	-0.3422 (2.08)
BC	-0.2154 (0.86)	-0.0312 (0.09)	0.2993 (1.19)	-0.4764 (2.49)	-0.8893 (4.63)	-1.1357 (5.88)
BCITY	-0.2017 (1.25)	-0.4943 (2.46)	-0.2353 (1.65)	0.0224 (0.22)	-0.0621 (0.55)	0.2478 (2.28)
SCITY	-0.0419 (0.17)	-0.1887 (0.66)	-0.0133 (0.06)	-0.2159 (1.26)	-0.0552 (0.31)	0.2709 (1.51)
NATIVE	-0.1040 (0.37)	-0.0306 (0.09)	-0.2623 (1.05)	-0.4392 (2.06)	-0.0174 (0.08)	-0.0241 (0.11)
Constant	-2.4878 (1.92)	-2.7076 (1.75)	-5.3299 (5.32)	-0.9079 (0.91)	-0.7399 (0.72)	-1.6379 (1.62)
RHO	0.6413 (4.69)	0.6811 (4.61)	0.6510 (5.32)	-0.3329 (2.45)	-0.0814 (0.52)	0.0264 (0.17)
logL	-1356.1	-1306.6	-1416.2	-1830.4	-1792.5	-1810.7

Note: Asymptotic t-statistics in brackets.
Source: Master file of the Canadian Survey of Literacy Skills Used in Daily Activities (LSUDA).

Table 5: The determinants of weeks worked for drop-outs

Independent variables	Men	Women
LIT	0.0550 (3.77)	0.0906 (4.71)
EDUC	0.8772 (2.19)	0.9197 (1.64)
AGE	2.2903 (4.34)	0.2770 (0.40)
AGE2	-0.0279 (4.13)	-0.0033 (0.36)
DIS	0.0529 (0.03)	-10.393 (4.27)
ENG	-4.4478 (1.63)	1.7464 (0.48)
MARR	6.4158 (4.15)	5.7064 (3.09)
CHILD	-0.7677 (0.54)	-4.1877 (2.41)
ATL	-8.7089 (4.47)	-15.686 (5.69)
QUE	-4.3318 (1.46)	-8.3645 (2.18)
PRA	1.8695 (1.04)	-1.8769 (0.76)
BC	0.2065 (0.10)	-18.498 (6.25)
BCITY	-2.2953 (1.87)	2.6066 (1.58)
SCITY	0.4597 (0.24)	1.4619 (0.55)
NATIVE	-7.7620 (2.87)	-7.4625 (2.31)
λ	7.4440 (4.01)	-4.1855 (1.95)
Constant	-27.826 (2.52)	-0.5457 (0.04)
	0.16	0.16
F	11.4	11.5

Note: T-statistics in brackets.
Source: Master file of the Canadian Survey of Literacy Skills Used in Daily Activities (LSUDA).

Table 6: The determinants of income

Independent variable	Men				Women			
	Drop-outs		High school and above		Drop-outs		High school and above	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LIT	0.0024 (3.55)	0.0024 (4.39)	0.0013 (2.69)	0.0012 (2.55)	-0.0012 (1.02)	0.0002 (0.22)	0.0022 (2.82)	0.0022 (2.85)
EDUC	0.0748 (3.86)	0.0580 (3.93)	0.0242 (1.85)	0.0124 (1.34)	0.1289 (3.56)	0.0976 (3.33)	0.1064 (4.14)	0.1031 (7.57)
AGE	0.0367 (1.92)	0.0575 (2.98)	0.1432 (10.30)	0.1436 (10.44)	0.0569 (1.72)	0.0391 (1.18)	0.1212 (6.40)	0.1225 (6.45)
AGE2	-0.0002 (0.88)	-0.0004 (1.79)	-0.0016 (8.64)	-0.0016 (8.40)	-0.0007 (1.50)	-0.0005 (1.17)	-0.0014 (5.31)	-0.0014 (5.34)
DIS	-0.0940 (1.40)	-0.0525 (0.76)	-0.0971 (1.83)	-0.0601 (1.09)	0.1303 (0.83)	0-.1260 (0.87)	-0.0331 (0.42)	-0.0210 (0.27)
ENG	0.0768 (0.71)	0.0497 (0.46)	0.1169 (1.86)	0.0939 (1.48)	0.0665 (0.30)	0.0545 (0.25)	0.0395 (0.49)	0.0273 (0.33)
MARR	0.0475 (0.79)	0.0739 (1.29)	0.3325 (9.50)	0.3307 (9.49)	-0.3381 (3.41)	-0.2852 (3.14)	0.0070 (0.16)	0.0075 (0.17)
CHILD	0.1564 (3.01)	0.1337 (2.58)	-0.0729 (2.10)	-0.0696 (2.02)	-0.1584 (1.81)	-0.1838 (2.18)	-0.2561 (5.64)	-0.2559 (5.64)
NATIVE	-0.1030 (1.10)	0.0369 (0.36)	0.0980 (0.91)	0.1983 (1.76)	-0.0726 (0.49)	-0.1292 (0.85)	0.1987 (1.77)	0.2172 (1.89)
ATL	-0.0496 (0.68)	-0.0322 (0.44)	-0.1995 (3.92)	-0.1752 (3.38)	-0.1391 (1.04)	-0.1781 (1.38)	-0.1738 (2.53)	-0.1675 (2.43)
QUE	0.0785 (0.68)	0.0209 (0.18)	0.0020 (0.03)	-0.0110 (0.17)	0.1409 (0.59)	0.0416 (0.18)	-0.1311 (1.59)	-0.1349 (1.64)
PRA	-0.0760 (1.18)	-0.1009 (1.56)	-0.1520 (4.00)	-0.1550 (4.05)	0.0644 (0.61)	0.0639 (0.61)	-0.1579 (2.96)	0.1578 (2.98)
BC	0.0690 (0.80)	0.0538 (0.71)	-0.1273 (2.67)	-0.1419 (2.94)	0.0616 (0.36)	0.0742 (0.46)	-0.1422 (2.28)	-0.1480 (2.35)
BCITY	0.0834 (1.87)	0.0714 (1.61)	0.1296 (4.11)	0.1231 (3.92)	0.2480 (3.22)	0.2843 (3.74)	0.1920 (4.34)	0.1894 (4.37)
SCITY	0.1116 (1.62)	0.0816 (1.19)	0.0443 (0.93)	0.0465 (0.99)	0.0226 (0.18)	0.0646 (0.51)	-0.0160 (0.24)	-0.0172 (0.26)
λ_1 (Selection on Emp)	-0.1106 (0.84)		0.0112 (0.16)		-0.2257 (1.32)		0.0016 (0.01)	
λ_2 (Selection on (NOT) drop)		0.2995 (3.81)		-0.2153 (3.28)		-0.3677 (3.04)		-0.0674 (0.74)
Constant	7.5710 (19.18)	6.9282 (16.74)	6.4469 (21.71)	6.6808 (24.33)	7.4562 (10.39)	8.1614 (10.86)	5.2757 (9.09)	5.3473 (13.81)
N (sample size)	719	719	1381	1381	496	496	1587	1587
F	13.7	14.9	44.1	45.1	4.7	5.3	20.3	20 4

Note: T-statistics in brackets.
Source: Master file of the Canadian Survey of Literacy Skills Used in Daily Activities (LSUDA).

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